

## CLAIMS

What is claimed is:

1. A developing device having a developing gap detecting function in an image forming apparatus, comprising:
  - a photosensitive medium forming an electrostatic latent image;
  - a developer conveyer depositing a developer to the electrostatic latent image formed on the photosensitive medium to form a visual image while rotating the photosensitive medium opposite thereto;
  - a power supply including DC and AC power sources and supplying DC and AC voltages respectively to the photosensitive medium and the developer conveyer;
  - a current detecting unit detecting a value of a DC current flowing on the developer conveyer when one of the DC and AC voltages of the power supply is outputted to develop the electrostatic latent image formed on an area of the photosensitive medium using the developer transferred from the developer conveyer; and
  - a controller obtaining a developing gap formed between the photosensitive medium and the developer conveyer based on the DC current value detected by the current detecting unit.
2. The developing device of claim 1, wherein when the electrostatic latent image formed on the area of the photosensitive medium is developed using the developer transferred from the developer conveyer, the DC voltage from the power supply is supplied to the developer conveyer.
3. The developing device of claim 1, wherein when the electrostatic latent image formed on the area of the photosensitive medium is developed using the developer transferred from the developer conveyer, an overlapped voltage of the DC and AC voltages from the power supply is supplied to the developer conveyer.
4. The developing device of claim 1, wherein the controller calculates a developing voltage adapted to the developer conveyer based on the obtained developing gap and supplies the developing voltage to the developer conveyer.

5. The developing device of claim 1, further comprising:  
a voltage detecting circuit detecting the AC voltage output from the AC power source;  
and  
a constant voltage control circuit which feeds-back a value of the detected AC voltage to the AC power source to maintain the value of the detected AC voltage as a target voltage value for developing,  
wherein the controller controls the constant voltage control circuit to output the developing voltage adapted to the developer conveyer.

6. The developing device of claim 1, wherein the image forming apparatus comprises an exposure member forming the electrostatic latent image on the photosensitive medium, wherein:  
based on the obtained developing voltage, the controller controls image forming conditions including a charged voltage for charging the photosensitive medium and a magnitude of light and a scanning time of the exposure member forming the electrostatic latent image on the photosensitive medium using the light.

7. The developing device of claim 1, wherein the controller controls such that a toner image, which is developed on certain area of the photosensitive medium by the developing of the electrostatic latent image with the developer for the purpose of developing gap calculation, is transferred onto a paper sheet as fed.

8. A developing device having a developing gap detecting function in an image forming apparatus, comprising:  
a photosensitive medium;  
an exposure member forming an electrostatic latent image on the photosensitive medium;  
a developer conveyer depositing a developer to the electrostatic latent image formed on the photosensitive medium to form a visual image;  
a power supply supplying a voltage to the photosensitive medium and the developer conveyer;

a current detecting unit detecting a current flowing from the power supply to the developer conveyer when the voltage of the power supply is outputted to develop the electrostatic latent image using the developer; and

a controller controlling one of a peak-to-peak, a duty ratio, a frequency, and a DC overlapped value of an AC voltage component of the power source to control image forming conditions of the developing device, and adjusting the voltage to charge the photosensitive medium, strength of light and a scanning time of the exposure member forming the electrostatic latent image on the photosensitive medium using the light.

9. A developing device having a developing gap detecting function in an image forming apparatus, comprising:

a photosensitive medium;

an exposure member forming an electrostatic latent image on the photosensitive medium;

a developer conveyer depositing a developer to the electrostatic latent image formed on the photosensitive medium to form a visual image;

a power supply supplying a voltage to the photosensitive medium and the developer conveyer;

a current detecting unit sensing a DC current flowing on the developer conveyer when a charged developer moves from the developer conveyer to the photosensitive medium; and

a controller adjusting the voltage supplied to the developing conveyer using the sensed DC current to maintain a density deviation and a line width of the visual image uniform.

10. A method in a developing device having a developing gap detecting function in an image forming apparatus having a photosensitive medium and a developer conveyer, the method comprises:

supplying DC and AC voltages to the photosensitive medium and the developer conveyer;

detecting a value of a DC current flowing on the developer conveyer when the DC and AC voltages is outputted to develop an electrostatic latent image formed on an area of the photosensitive medium using a developer transferred from the developer conveyer;

obtaining a developing gap formed between the photosensitive medium and the developer conveyer based on the detected DC current value; and

calculating a developing voltage adapted to the developer conveyer to be supplied to the developer conveyer based on the obtained developing gap.

11. A method in a developing device having a developing gap detecting function in an image forming apparatus having a photosensitive medium and an exposure member forming an electrostatic latent image on the photosensitive medium, the method comprises:

controlling one of a peak-to-peak, a duty ratio, a frequency, and a DC overlapped value of an AC voltage component of an AC power source supplying a voltage to the developing device to control image forming conditions of the developing device; and

adjusting a charged voltage to charge the photosensitive medium, strength of light and a scanning time of the exposure member forming the electrostatic latent image on the photosensitive medium using the light.

12. A method in a developing device having a developing gap detecting function in an image forming apparatus having a photosensitive medium and a developer conveyer to form a visual image, the method comprising:

sensing a DC current flowing on the developer conveyer when a charged developer moves from the developer conveyer to the photosensitive medium; and

adjusting a charged voltage supplied to the developing roller using the sensed DC current to maintain a density deviation and a line width of the visual image uniform.